STATE OF HAWAIʻI

Information and Communications Services Division

Category	**Radio**	Title	**Hawaiʻi Statewide Interoperability Channel Plan**
Document:	**ICSD-10.R01**	Revision:	**2011.03.01**
Posted URL:	http://icsd.higov.net/policies-procedures		
Status	Adopted	Revised on:	March 1, 2011
Authority:	**See** http://icsd.higov.net/policies-procedures/governing-statutes	Exceptions:	Temporary Allowed
Applicability	☒State Government Agencies ☒All ..... Policy ☐Excluding ..... Not Applicable ☐Including: ..... Not Applicable ☒State Funded Entities ..... Policy ☒Other: All others allowed on State Channels ..... Policy		

Hawaiʻi Statewide Interoperability Channel Plan

CONTENTS

I. PURPOSE

Public Safety Interoperability Channels[1]: 150 MHz – 869 MHz

Developed with assistance of the Hawai‘i Statewide Communications Interoperability Plan (SCIP) Committee.[2]

This Channel Plan describes conditions and guidelines for use of FCC designated and state-licensed interoperability channels by various Responsible Organizations:

- Local government jurisdictions and their associated organizations
- State agencies in Hawai‘i and their associated organizations
- Federal agency local units in Hawai‘i and their associated organizations
- Private sector emergency response organizations licensed or otherwise entitled to operate in the Public Safety Pool as defined in Part 90 of the FCC Rules (sections 90.15-90.20) and those defined as non-governmental organizations (NGOs) in the Hawai‘i Statewide Communications Interoperability Plan (SCIP)

The State of Hawai‘i Department of Accounting and General Services (DAGS) has notified or will notify Responsible Organizations in writing that it has conditionally extended privileges to them for the use of frequencies included in the licenses specified in this plan. This satisfies Federal Communications Commission Part 90 rules for extending license privileges to others by agreement.

These licenses provide for:

- Operation of VHF, UHF, 700 MHz band, and 800 MHz band radio equipment on interoperability channels within Hawai‘i.
- Operation of mobile, portable, temporary base, temporary repeater/mobile relay and control station (6.1 meter rule applies) radios only.
- Operation of permanently installed repeaters (aka mobile relays) and fixed base stations, such as dispatch points, PSAP’s, offices, etc... with the above radios**. Any of these permanantly installed radios must be separately licensed by the operating organization.**

[1] As designated by the FCC or licensed by the State of Hawai‘i.

[2] And thanks to the Texas Statewide Interoperability Executive Committee for providing the excellent template that was used as a basis for this document.

The State of Hawai‘i has acquired the following licenses for interoperability purposes in Hawai‘i:

Channel Band	FCC License
VHF (150-170 MHz) Narrowband	WQMM331
UHF (450 to 470 MHz) Narrowband	WQMM356
800 MHz	WQMM833
700 MHz	None[3]

Responsible Organizations that have had the license privileges detailed in this Channel Plan extended to them may sub-assign the privileges to other entities. Any entity accepting such a sub-assignment must be listed in at least one of the Regional Tactical Interoperable Communications Plans (TIC Plans). The Hawai‘i, Maui, O‘ahu, and Kaua‘i Regional Planning Zones (RPZ) have developed TIC Plans to coordinate interoperable communications in their regions. That sub-assignment will only apply to the area of that RPZ. If an entity needs to operate in multiple RPZs they will need other sub-assignments or a statewide assignment from the State. When the State issues statewide assignments and/or special assignments, all RPZ coordinators will be notified. The entity will be directed to coordinate with the RPZs on the operations and use in each RPZ. Any sub-assignment issued by the Responsible Organization must be in writing (e-mail is acceptable) to a specific entity and a copy of that written document must be provided to the State of Hawai‘i Department of Accounting and General Services. A sub-assignment will not be considered valid until it is recorded by DAGS and such recording is acknowledged to the original Responsible Organization. The Responsible Organization will ensure that the sub-assigned entity is provided a copy of this channel plan and understands that it is responsible for adherence to it. The sub-assignment must include the number of each type of radio the entity will be allowed to use under this channel plan. DAGS will use these numbers to ensure that the FCC licenses remain up to date.

Note that federal government agencies do not normally use the frequencies associated with this channel plan. Many federal agencies are a vital part of the public safety community in Hawai‘i; therefore they may have license privileges extended to them in accordance with 47 CFR 2.102 (c) & 2.103 and Part 7.12 of the NTIA Manual.

Should a Responsible Organization elect to no longer participate in the use of these interoperability channels, notice shall be given by mail to: State of Hawai‘i Department of Accounting and General Services; Information and Communications Services Division; P.O. Box 119; Honolulu, HI 96810-0119.

[3] 700 MHz channels referenced in this plan are all national channels and need no license for mobile, portable, temporary base, temporary repeater/mobile relay or control station radios used by authorized entities.

II. SCOPE

Governance

In 2007 the Director of Hawai‘i State Civil Defense stood up a SCIP committee under the governance of the Hawai‘i Wireless Interoperability Network (HWIN) Executive Committee to develop and maintain the statewide strategic plan to enhance statewide voice and data interoperability.

SCIP Representation:

- Federal Department of Defense's (DOD) PACOM designee
- Federal Department of Homeland Security's (DHS) (United States Coast Guard District Fourteen) designee
- State Civil Defense Telecommunications Manager
- State Department of Accounting and General Services (DAGS) designee
- Hawai‘i National Guard designee
- Hawai‘i County regional coordinator
- Maui County regional coordinator
- Kaua‘i County regional coordinator
- City and County of Honolulu regional coordinator
- Non-government agency representative

A key responsibility of the SCIP committee is to establish interoperability standards and agreements. The Hawai‘i Statewide Interoperability Channel Plan provides an essential standard for interoperable radio communications using VHF, UHF, 700 MHz, and 800 MHz radio equipment for interagency coordination, en-route travel, or on-incident communications.

III. TERMS AND DEFINITIONS

CAI or Common Air Interface – CAI is the part of the P25 standard used to specify the type of digital radio signals transmitted by P25 compliant radios.

Control Station – In this plan a control station is a fixed radio used to transmit to mobile radios only through a repeater. The FCC Station Class Code is FX1.

Channel – A frequency or pair of frequencies (transmit and receive). A channel is not a talk-group. Operating on a single channel usually implies conventional operation. Trunking radio sites use multiple channels and assign active channels to talk groups on an as needed basis.

CTCSS or Continuous Toned-Coded Squelch System – On analog radio systems a CTCSS tone is used to allow different groups to share the same channel by only passing transmissions with the correct tone to the user's receiver. Also known as tone squelch, CG (Channel Guard), or marketed by Motorola as PL (Private Line) codes. CDCSS or DCS refers to Digital Coded Squelch, which is similar to CTCSS in function, but utilizes digital tones (also marketed by Motorola as DPL codes).

DAGS or Department of Accounting and General Services – The Department of the State of Hawai‘i government that maintains this plan.

Direct – A direct radio to radio conversation does not use a repeater. The transmit and receive signal use the same frequency, often the repeater transmit (or output) side of the channel pair. This is also referred to as a simplex channel, or a talk-around channel.

Frequency – The FCC assigns all frequencies used in this plan. Each channel in this plan is assigned at least one distinct frequency.

FCC or Federal Communications Commission – The FCC issues all state and local licenses for use of radio frequencies in this plan. The NTIA regulates the use of frequencies for military and federal agency use. No NTIA frequencies are included in this plan.

HWIN or Hawai‘i Wireless Interoperability Network – An informal committee representing all the local, state and federal government agencies in the state. The HWIN acts as the overall governance body responsible for interoperable communications in Hawai‘i.

ICS or Incident Command System – All jurisdictions in Hawai‘i use the national ICS to manage events and incidents. The ICS is a component of the NIMS.

ICSD or Information and Communications Services Division – The specific division of the DAGS that maintains this plan.

Must-carry – All jurisdictions in Hawai‘i have agreed that in order to conduct interoperable communications all public safety radio users need a common set of channels. In the VHF, UHF and 800 MHz bands this plan designates those channels. Any public safety user in Hawai‘i with a radio in any of these bands "Must-carry" these frequencies in that band on their radios.

NAC or Network Access Code – On digital radio systems a NAC is used to allow different groups to share the same channel (in a manner similar to a CTCSS or CDCSS tone in an analog system) and to control access to trunking system resources.

Narrowband – For VHF and UHF frequency bands in this plan, narrowband operation implies that the signal occupies a bandwidth less than or equal to 12.5 kHz. No 6.25 kHz channels (the future narrowband proposal) are used in this plan.

NGO or Non-Governmental Organization – A private entity with a public safety or disaster response/recovery role defined in national, state or RPZ plans.

NIMS or National Incident Management System – The State of Hawai‘i and each of its four counties have adopted and use NIMS for emergency response operations.

NPSTC or National Public Safety Telecommunications Council – A non-governmental body comprised of numerous organizations working to improve public safety communications. NPSTC has proposed a naming standard for national interoperability frequencies. Hawai‘i has not agreed to adopt this standard.

NTIA – National Telecommunications and Information Administration

P25 or Project 25 – Project 25 refers to a suite of standards for digital radio communications for use by federal, state and local public safety agencies in the U.S. to enable them to communicate with other agencies and mutual aid response teams in emergencies.

Repeater – In this plan a repeater is used to relay transmissions from one mobile radio to another. The official FCC name for this type of repeater is a Mobile Relay. FCC Station Class Codes for the types of repeaters in this plan are FB2 and FB2T.

RPZ or Regional Planning Zone – There are four RPZs in Hawai‘i: Hawai‘i, Kaua‘i, Maui and O‘ahu.

SCIP or Statewide Communications Interoperability Plan – The Hawai‘i SCIP committee acts as the interoperability governance body for public safety organizations throughout the state. The SCIP committee is organized under the HWIN.

Station Class – The FCC licenses transmitter frequencies based on an FCC Station Class. Station Classes associated with this plan:

FB: Base	FBT: Base – Temporary
FB2: Mobile Relay (fixed repeater)	FB2T: Mobile Relay – Temporary
FX1: Control	
MO: Mobile (portables and mobiles)	
MO3: Mobile/Vehicular Repeater	

STR or Strategic Reserve – Using federal grant funds, the State of Hawai‘i has established an STR of cache radios for major incidents. This STR includes the TRIC packages.

Subscriber Radio – A radio carried by a subscriber to a system. Generally this refers to mobile or portable radios.

Talk Group – An assigned “channel-like” or pseudo channel in a trunked radio system. A talk group does not have a permanent frequency, but uses one of a set of frequencies assigned to the trunked system and selected for use by the trunking system controller as a call is initiated. A talk group is not a channel.

TIC Plan – Tactical Interoperable Communications Plan, sometimes referred to as a TICP. Each RPZ has its own TIC Plan.

TRIC or Transportable Repeater for Interoperable Communications – The State and counties have acquired TRIC packages to facilitate cross-band communications using the channels in this plan. The TRIC packages are part of Hawai‘i’s strategic reserve (STR).

Wideband – For VHF and UHF frequency bands in this plan, wideband is a frequency bandwidth greater than 12.5 kHz.

UHF or Ultra High Frequency – In this plan UHF frequencies are between 450 and 470 MHz.

VHF or Very High Frequency – In this plan VHF frequencies are between 150 and 174 MHz.

700 MHz – In this plan 700 MHz frequencies are between 769 and 805 MHz.

800 MHz – In this plan 800 MHz frequencies are between 806 and 869 MHz.

IV. POLICY

Any State of Hawai‘i public safety agency using radios will implement this plan. By accepting the license privileges associated with the ***Hawai‘i Statewide Interoperability Channel Plan***, each Responsible Organization agrees to abide by the conditions and operating procedures in this plan.

V. STANDARDS

Background

Narrowbanding Mandate

Nation-wide, public safety communication is in a period of great change driven by FCC regulatory changes, by new technology, and by federal requirements.

Long-used VHF and UHF wideband radio channels with 15 / 25 kHz spacing are being replaced with narrowband radio channels (less than 12.5 kHz bandwidth). This will create more communications channels for public safety users. Unfortunately, the new narrowband channels are fitted within and between the old wideband channels, which will result in interference

between wideband and narrowband users. This Plan does not consider any use of wideband channels below 512 MHz[4]; however the FCC licenses may allow some use until 2013.

Generally, radios manufactured after 2000 are capable of operation on both wideband and narrowband channels. Due to interference, narrowband channels cannot be used effectively if a wideband co-channel or a wideband adjacent channel is being used within the operational range of either user.

The Federal Communications Commission has established a deadline for wideband system conversion to narrowband by January 1, 2013, even though many wideband licenses expire after this date. After January 1, 2013, all wideband operation below 512 MHz must cease (with very few exceptions, which do not generally affect any users in Hawai‘i). This plan addresses these problems by only allowing use of narrowband interoperability channels below 512 MHz.

P25 or Project 25

Both wideband and narrowband communications radios have traditionally used analog modulation to convey voice. Beginning in 2005, equipment capable of either analog or digital modulation began to become widely available, most built to be compliant with the Project 25 specifications (often designated "P25").

There is currently no regulatory requirement or deadline to change from analog modulation to digital modulation on VHF, UHF, and 800 MHz bands. Therefore, this plan presumes that some public safety users may not immediately purchase digital-capable radio equipment, and for that reason all interoperability channels (except 700 MHz) are defined to use analog modulation.

The Statewide Communications Interoperability Plan committee anticipates that all federal grants will soon require that grant funds be spent only for P25 compliant digital-capable equipment and advises all organizations to purchase P25 compliant equipment. At some point the SCIP committee will most likely require that all communications using interoperability channels in Hawai‘i must use compliant P25 Phase 1 (CAI) digital modulation. Organizations are urged to plan accordingly.

Data

At the time of issue, there are no interoperable data standards established in the State of Hawai‘i. As data standards mature, this document will add them.

[4] There are two exceptions in the VHF band: VINT1 in Hawai‘i County, and VHF COM on O‘ahu. Details are in the Specific Guidelines – VHF 150 MHz Narrowband Channels section.

Channel Naming

Hurricane Katrina re-emphasized the need for common interoperability channels in public safety radios. Also highlighted was the need for public safety radio users to have common labels for these channels. Various common naming plans have been drafted for use in all jurisdictions within the United States. The names from some of these drafts are reflected in this document. Where needed, a crosswalk table of Hawai‘i channel names to national names has been included.

General Conditions for Use of State Licensed Interoperability Channels

By accepting the license privileges associated with the ***Hawai‘i Statewide Interoperability Channel Plan***, each Responsible Organization agrees to abide by the following general conditions:

Operational

Mobile, portable, temporary base, temporary repeater/mobile relay, and control station transmitters will be configured with the appropriate Must-Carry channels (i.e. in-band interoperability frequencies) and CTCSS tones or NAC codes as found in the Hawai‘i Statewide Interoperability Channel Plan. This means that, as a minimum, the Must-Carry channels will be added to the day-to-day subscriber radios used by each entity.[5]

Interoperability frequencies will be used for their intended purpose of coordination between response agencies and resources. Such coordination may occur during interagency operations, en-route travel, or on-incident.

The interoperability channels are not to be used for routine dispatch operations, but may be used by dispatchers for communications with personnel in the field, in accordance with RPZ and local policies and procedures. The interoperability tactical channels may be used for day-to-day emergency operations in the absence of higher priority events.

Use of the interoperability channels shall be prioritized as follows:

1. Emergency or urgent operation involving imminent danger to life or property
2. Disaster or extreme emergency operation requiring extensive interoperability and inter-agency communications
3. Special events, generally of a pre-planned nature
4. Joint training exercises

[5] Some systems may be limited in channel capacity. In this case the entity will not be required to program all the Must-Carry channels in every radio.

5. Inter-agency and en-route communications in accordance with RPZ and local policies and procedures.
6. Day-to-day tactical communications on scene

Use of the interoperability channels for on-incident communications shall be in accordance with an Incident Communications Plan (ICS-205) established by the on-scene incident commander. The controlling agency for an incident shall, through its Incident Commander, assign and/or reassign interoperability channels for each operational period as required to support incident operations.

Radio communications procedures on the interoperability channels must be consistent with the National Incident Management System (NIMS) and Incident Command System (ICS) including:

- The use of "plain language" without 10-codes or agency-specific codes/jargon.
- Standard calling protocol: "Agency-Unit #, this is Agency-Unit #", rather than "Unit # to Unit #".
  (Examples: "*Honolulu Fire 8, this is Federal Fire 6*" or "*Mokulele Incident Command, this is US Coast Guard 4135")*

Interoperability channels may be used only for voice traffic. Paging, alert tones, and SCADA operations are not permitted on interoperability calling or tactical channels. User-initiated telephone interconnect, e.g. phone patch, is not permitted on the interoperability channels.

All mobile and portable radio equipment should employ a time-out timer set to limit transmission duration to a period of no greater than 120 seconds (2 minutes).

To alleviate confusion, the standard channel names listed in this plan should be used in all equipment to refer to individual channels. Previously used mutual-aid channel designations ("Mutual Aid 1, VTAC1, etc.), are no longer valid, and should be removed from equipment in the field. Any interoperability talk groups on existing local systems will be renamed to indicate the operating agency (Interoperability 1 becomes Honolulu Interoperability 1; Mutual Aid 7 becomes Hawai'i County Mutual Aid 7 …)[6].

Radios not capable of displaying alphanumeric channel labels should have placards attached or issued with the radios to indicate the channel names and their corresponding positions on the radio's channel selector switch.

[6] This renaming may require major subscriber radio programming for widely deployed systems. It is understood that it may take several years before all agencies can comply with this requirement on all radios/systems.

Co-Channel and Adjacent Channel Interference

The statewide interoperability channels and associated tones/codes in this plan are allowed to be used by multiple entities statewide, therefore co-channel interference between radios used in simultaneous incidents is possible. Given adequate geographic separation, coordinated co-channel operations at separate incidents and venues may be conducted if effective radiated power (ERP) is limited to the minimum level required to maintain reliable communications at each incident.

Because the FCC has established new narrowband channels within and adjacent to existing wideband channels below 512 MHz[7], interference to and with these properly-licensed wideband channel users is expected to occur until 1 January 2013, when all channels will be narrowband only.

Many different users and organizations will be using these common frequencies throughout the state. Users will use reasonable care to minimize interference with other legitimate users. All users are reminded that non-emergency communications is always secondary to emergency traffic.

Co-channel and adjacent channel interference issues during an incident or event must be resolved by the on-scene incident commander. Hawai‘i State Civil Defense should immediately be notified of unresolved interference to the interoperability channels in order to assist in resolution of the problem.

Calling Channels

Initial radio contact during travel to, or arrival at an emergency incident may be established on an appropriate interoperability calling channel. Calling channels designated as VCALL, UCALL, ICALL, 7CALL50 and 7CALL70 are intended to provide for local and itinerant-user communications with local public safety dispatchers. Additionally, the calling channels may be used by en-route emergency resources seeking to make contact with the Incident Command Post or staging area(s) at a large-scale incident.

Interoperability calling channels must be monitored at the Incident Command Post on major incidents requiring significant aid from agencies beyond routine local interoperability. Monitoring shall include one or more of the following:

- ICALL(8CALL90), national 800 MHz calling channel
- VCALL (VCALL10), national narrowband VHF calling channel
- UCALL (UCALL40), national narrowband UHF calling channel

[7] Throughout this document the terms narrowband channels and wideband channels will refer to voice channels with emission bandwidths below 12.5 kHz and above 12.5 kHz respectively.

- 7CALL50 or 7CALL70, national digital narrowband P25 700 MHz calling channels

Calling channel communications will use non-encrypted analog FM emissions. Exception: All 700 MHz radios must use Project 25 Phase 1 CAI digital modulation with the appropriate NAC.

- If a county has primarily VHF users, VCALL (VCALL10) will be continually monitored by public safety dispatch points within the county.
- If a county has primarily UHF users, UCALL (UCALL40) will be continually monitored by public safety dispatch points within the county (No counties in Hawai‘i presently use a UHF dispatch system).
- If a county has primarily 700 MHz band users, the channel 7CALL50 will be continually monitored by appropriate dispatch points within the county (No counties in Hawai‘i presently use a 700 MHz dispatch system).
- If a county has primarily 800 MHz band users, the 800 MHz channel ICALL(8CALL90) will be continually monitored by appropriate dispatch points within the county.

Many public safety radio users located in the various counties operate in other radio bands than the counties' systems. RPZ TIC plans should recognize and address the monitoring capabilities that will be needed within their jurisdictions in order to assure interoperability among public safety users. For some RPZs, monitoring VHF and 800 MHz calling channels may be adequate. Others may need to monitor additional calling channels in order to assure that interoperability is achieved.

Cross-band patching of calling channels to calling channels in other bands is permitted. Patching of calling channels to any channel other than VCALL (VCALL10), UCALL (UCALL40), 7CALL50, 7CALL70 or ICALL (8CALL90) is strictly prohibited. To maximize the coverage of calling channels in all bands they may be patched together for routine day-to-day operations. When an Incident Commander stands up a command center the calling channels should generally not be cross patched, but should be answered individually if feasible. Throughout the incident, at least one member of each unit or team should monitor the appropriate calling channel (as designated in the incident's ICS-205 form).

CTCSS and NAC Coded Squelch

Continuous Tone Coded Squelch System (CTCSS) tones and/or digital Network Access Codes (NAC) shall be used on the interoperability calling and tactical channels to mask interference, in accordance with the figures listed in this plan.

Receivers may be set for carrier squelch operation unless conditions in the area require the use of tone protection to mitigate the effects of adjacent channel interference, or interference from intermodulation products.

Subject to approval from applicable RPZ planning committees, mobile relay stations (aka repeaters) that are part of a RPZ or statewide interoperability plan may be equipped with a second receive CTCSS tone to provide local (in cabinet) relay operation, provided:

- The relay transmitter continues to transmit the CTCSS tone of 156.7 Hz or appropriate 800 MHz tone so that all users within range of the station are aware the station is in use; and
- The relay will accept the CTCSS tone of 156.7 Hz or appropriate 800 MHz tone and present the audio accompanying the CTCSS encoded transmission to either the associated network or a live operator at the appropriate controlling dispatch facility; and
- The operational configuration of the repeater/mobile relay station is published in the applicable interoperability resource tracking documents (SCIP, TIC Plan, and/or FCC approved Regional Planning Committee plan) and databases (CAPRAD and/or CASM).

The Network Access Code (NAC) $293 hex (659 decimal) is required for all P25 digital operations on the interoperability channels. At this point in time for this plan, only the 700 MHz channels use P25 digital standards.

Subject to approval from applicable RPZ planning committees, repeater/mobile relay stations that are part of a RPZ or statewide interoperability plan may be equipped with a second receive NAC to provide local (in cabinet) relay operation, provided:

- The relay transmitter continues to transmit the $293 hex or 659 decimal NAC so that all users within range of the station are aware the station is in use;
- The relay will accept the $293 hex (659 decimal) NAC and present the audio to either the associated network or a live operator at the appropriate controlling dispatch facility; and
- The operational configuration of the repeater/mobile relay station is published in the applicable interoperability resource tracking documents (SCIP, TIC Plan, and/or FCC approved Regional Planning Committee plan) and databases (CAPRAD and/or CASM).

Only the CTCSS tones and NAC Codes identified in this channel plan are allowed on the interoperability channels within the state except as noted above. These tones and codes shall not be changed nor others added by an individual agency, communications vendor, or maintenance service provider. [8]

[8] VHF COM may continue to use the CDCSS of 364 on O‘ahu only. Hawai‘i County may use additional tones on VINT1 in that county.

Modulation and Encryption

This plan identifies allowable modulation and encryption on calling and tactical channels:

Calling Channels: Analog modulation is mandatory on all calling channels to facilitate interoperability with legacy radio equipment being used in the field. Exception: Communications on 700 MHz interoperability channels must always use P25 Phase 1 CAI digital modulation.

Tactical Channels: Analog modulation is preferred on all interoperability tactical channels to facilitate interoperability with legacy radio equipment in the field. Exception: Communications on 700 MHz interoperability channels must always use P25 Phase 1 CAI digital modulation.

Local agencies may use interoperability tactical channels for day-to-day public safety related purposes not requiring communications with emergency resources from other jurisdictions. In such events, non-encrypted digital modulation is authorized on tactical interoperability channels in all bands. When used, digital modulation for interoperability channels shall be P25 Phase 1 CAI compliant and shall use the following configuration criteria:

- Network access code shall be $293 hex (659 decimal)
- Talk group ID shall be 0001 (hex or decimal)
- Manufacturer's ID shall be 00 (hex or decimal)
- Message Indicator shall be $000000000 hex

For occasional pre-planned events where communications security is an issue, encrypted P25 Phase 1 CAI modes are authorized on tactical channels. Specific encryption algorithms and encryption keys shall be as defined by the event Incident Commander.

Temporary Base (FBT), Temporary Repeater/Mobile relay (FB2T) and Control Stations (FX1)

Temporary base stations, temporary repeater/mobile relay stations and control stations are permitted by the licenses associated with this channel plan, with the following conditions or restrictions:

- Antennas used for temporary base stations and temporary repeaters/mobile relays may not exceed 12.2 meters (40 feet) above ground.
- Temporary base stations, temporary repeaters/mobile relays and control stations that are deployed under this plan may not exceed FCC licensed limitation of 100 Watts transmitter power and 100 Watts Effective Radiated Power (ERP).[9]

[9] Lower power limitations listed in Specific Guidelines and Channel Tables apply regardless of the licensed power limit.

- Temporary base, temporary repeater/mobile relay and control stations shall have an automatic time-out timer limiting transmit duration to no greater than 120 seconds (2 minutes).
- Temporary base and temporary repeater/mobile relay stations when operating in the repeater mode shall be configured to immediately drop transmit carrier upon cessation of input signal (zero "hang time"). Reasonable squelch hang time for weak received signals or signals that have achieved a critical bit error rate (BER) is permitted.
- Temporary base stations and temporary repeaters/mobile relays must utilize manual switching or dedicated RF control links, wire line, microwave, fiber or satellite circuits as a means of primary control. Interoperability channels shall not be enabled, disabled or muted by any over-the-air signaling device (selective or DTMF signaling, etc) as a primary means of control.
- Temporary base and temporary repeater/mobile relay stations shall not be left in permanent operation and must be disabled upon conclusion of an incident or exercise. Permanently installed standby repeaters/mobile relays must be separately licensed. Contact the State Department of Accounting and General Services for assistance.
- Fixed Control Stations (FX1s) may be established on a permanent or temporary basis statewide using interoperability channels. The antennas of these control stations must adhere to the 6.1 meter rule detailed in Section 90.119 of the FCC Rules. Specifically the height of the control station antenna must not exceed 6.1 meters (20 feet) above ground or an existing man-made structure. An antenna structure (e.g. a radio tower) is not included in this exemption for a man-made structure. Therefore the limit of 6.1 meters above ground still stands when attaching the antenna to an antenna structure.
- End-of-transmission "courtesy tones" or "beeps" are not allowed on any interoperability channel.

Specific Guidelines – VHF 150 MHz Narrowband Channels

Note: This plan does not recognize or identify VHF or UHF wideband (above 12.5 kHz bandwidth) channels.

For VHF interoperability, the five national direct channels described in Figure 1 (VCALL through VTAC4) will be used. In addition there are five Region 11 (Hawai‘i) repeater channels, four low-level tactical repeater channels and three national direct tactical channels that are described in Figure 1 below. Note that wherever channels are assigned as a pair, the portable/mobile transmit frequency will usually be more than 5 MHz higher than the receive frequency.

All VHF radio using public safety agencies and users of VHF frequencies associated with this plan "Must-Carry" the channels listed in Figure 1 (exceptions for VFIRED, VMEDD, VLAWD, COML, VCOMLD and VHF COM are noted in the figure) in their VHF subscriber radios.[10]

Note the following:

- The FCC has identified VHF interoperability channels that can be used throughout the United States (VCALL, VTAC1 – VTAC4, VFIRED, VMEDD and VLAWD). Region 11 has identified VRs (Regional Tactical Interoperability Channels) and VINTs (Low Level Tactical Interoperability Channels) for use within Hawai‘i. Some of these interoperable channels may already be licensed by multiple agencies for interoperability use throughout the state.
- The national channel VCALL is designated as a multi-discipline, multi-agency public safety interoperability calling channel for all public safety agencies and other users of the frequencies associated with this channel plan. This channel is designated for interoperable VHF communications between mobile/portable radios and base stations, temporary base stations and an on-incident incident commander. Note that VCALL is a direct or simplex only channel.[11]
- The national tactical direct channels VTAC1, VTAC2, VTAC3 and VTAC4 should be assigned on incident by the incident commander. Note that local naming convention usually adds the D suffix to each name to indicate direct mode (simplex). Although simplex use is specified in the national plan, it omits the D suffix and we also omit it for these unique VHF channels.[12]

---

[10] Some systems may be limited in channel capacity. In this case the entity will not be required to program all the Must-Carry channels in every radio.

[11] The national interoperability calling channel VCALL is different from the calling channels in the other bands. It only has a single channel assigned instead of a pair of channels.

[12] The national interoperability tactical channels VTAC1, VTAC2, VTAC3 and VTAC4 are different from the tactical channels in the other bands. They only have a single channel assigned instead of a pair of channels.

- The tactical direct channels VFIRED, VMEDD and VLAWD will never be repeated and are to be used in direct (simplex) mode only. VFIRED is only for Fire/EMS use, VMEDD is only for Fire/EMS use and VLAWD is only for Law Enforcement use. VMEDD is also intended for ground to air use during medical incidents.
- Gateways, patching or cross-band repeating of the VHF calling channel is only allowed to calling channels in other bands. Gateways, patching or cross-band repeating of VCALL to any channels other than ICALL, UCALL, 7CALL50 or 7CALL70 is not permitted.
- Patching to/between interoperability tactical channels is permitted during emergency situations if so directed by the incident commander.
- There is a 15 Watt maximum ERP limit on VINT1 through VINT4. This limit is for any transmission including portables, mobiles, base stations, temporary repeaters/mobile relays or fixed repeaters/mobile relays. There is however, an exception for Hawai‘i County. Hawai‘i County may use VINT1 on high power at their licensed fixed repeater/mobile relay sites. In addition, Hawai‘i County may use VINT1on bandwidths up to 25.0 kHz until December 31, 2012. On January 1, 2013 all users (including Hawai‘i County) must use it with narrowband emissions only.
- High Site, High Power Installation of VTAC1, VTAC2, VTAC3, and VTAC4 is prohibited in the State of Hawai‘i. Instead, these assets are designated for use within more limited regional footprints to enable on-site interoperable communications between multiple agencies for incident support.
- The VRs may be installed at fixed, high Site, high power repeaters/mobile relays as follows: VR5 & 7 may be installed at repeaters/mobile relays in Kaua‘i & Maui counties; VR6[13] & 8 may be installed at repeaters/mobile relays in Honolulu and Hawai‘i counties. Any fixed repeaters/mobile relays will require separate licenses acquired by their operators.
- VR9 is a special channel designated for cross-band repeat, primarily on deployable repeaters/mobile relays.
- Note that the use of P25 compliant radios may become mandatory for public safety users in Region 11 at some point in the future. Until that point all radios will use the CTCSS codes designated in Figure 1.
- The channels described in Figure 1 are to be used in accordance with this plan as narrowband channels only.[14] However, users should recognize that in-coming resources from out-of-region might not be equipped with all of these channels, or may have some of them installed in wideband radios.

[13] VR6 shares frequencies with VHF COM on O‘ahu. Contact the O‘ahu RPZ to use this channel on O‘ahu.

[14] With the noted exceptions for VINT1 by Hawai‘i County and VHF COM on O‘ahu.

- Mobile Command Posts should be equipped with temporary transmitters as follows:
    - VCALL Base, dedicated to monitoring at all times (station class FBT)
    - Interoperability direct channel base stations (station class FBT)
    - Interoperability repeater/mobile relay control stations (station class FX1)
    - Temporary repeater/mobile relay stations (Station Class FB2T) may also be deployed
- The City and County of Honolulu has licensed and maintains a wideband (bandwidth over 12.5 kHz) simulcast repeater system named VHF COM (VHF Common) on the island of O‘ahu. They have allowed the VHF COM frequencies to be shared statewide as VR6. VHF COM will likely remain as a wideband channel until December 31, 2012. Organizations using VR6 on O‘ahu should contact the O‘ahu RPZ committee for information on how to best use this channel.
- The VCOML channel may only be used by a certified Communications Unit Leader (COML) in support of incident operation or exercise communications in Hawai‘i County. The COML may only program this channel into temporary bases, temporary repeaters/mobile relays, mobiles and control stations that are under the direct control of members of the Communications Unit. Emission and power limits must adhere to the license (WQMM331). The COML will assign the CTCSS tones for use during an incident/exercise. In the absence of a tone assignment, all radios will use carrier squelch only (CSQ) to transmit and receive.
- Note that some older (estimated pre 2000) radios claiming to be capable of using a narrowband mode (less than 12.5 kHz) may not accommodate all frequencies below 12.5 kHz. VTAC2 (154.4525 MHz) is an example of one frequency that may not function on these radios. Users must replace these radios if they have this issue.

Figure 1 - VHF 150 MHz Narrowband Interoperability Channels

Emission Designator: 11K0F3E

Mobile and Portable Configuration						
Label	**Direct Label**	**Receive (Rx)**	**Trans (Tx)**	**Station Class[15]**	**CTCSS RX/TX**	**Usage**
	VCALL	155.7525	155.7525	FBT / MO	CSQ/ 156.7	Calling Channel
	VTAC1	151.1375	151.1375	FBT / MO	CSQ/ 156.7	Tactical (direct)
	VTAC2	154.4525	154.4525	FBT / MO	CSQ/ 156.7	Tactical (direct)
	VTAC3	158.7375	158.7375	FBT / MO	CSQ/ 156.7	Tactical (direct)
	VTAC4	159.4725	159.4725	FBT / MO	CSQ/ 156.7	Tactical (direct)
VR5		150.995	158.91	FB2T/MO/FX1	156.7	Tactical – High site/Power Repeat only in Kaua‘i and Maui
	VR5D	150.995	150.995	FBT / MO	156.7	
VR6		154.28	153.77	FB2T/MO/FX1	156.7	Tactical – High site/Power Repeat only in O‘ahu and Hawai‘i (aka Honolulu VHF COM)
	VR6D	154.28	154.28	FBT / MO	156.7	
VR7		151.07	158.97	FB2T/MO/FX1	156.7	Tactical – High site/Power Repeat only in Kaua‘i and Maui
	VR7D	151.07	151.07	FBT / MO	156.7	
VR8		151.04	158.985	FB2T/MO/FX1	156.7	Tactical – High site/Power Repeat only in O‘ahu and Hawai‘i
	VR8D	151.04	151.04	FBT / MO	156.7	
VR9		151.22	159.045	FB2T/MO/FX1	156.7	Special – Default use is for cross-banding repeat in any RPZ
	VR9D	151.22	151.22	FBT / MO	156.7	
VINT1[16]		151.25	159.12	FB2T/MO/FX1	156.7	Tactical-Low Level Repeat only (Less than 15 Watts ERP)
	VINT1D	151.25	151.25	FBT / MO	156.7	
VINT2		151.28	159.15	FB2T/MO/FX1	156.7	Tactical-Low Level Repeat only (Less than 15 Watts ERP)
	VINT2D	151.28	151.28	FBT / MO	156.7	
VINT3		151.325	159.1725	FB2T/MO/FX1	156.7	Tactical-Low Level Repeat only

[15] FB2T (temporary repeater/mobile relay) is only licensed for the Receive (Rx) and FX1 (Control) is only licensed for the Transmit (Tx) frequency. MO (mobile or portable) is licensed for both.

[16] Hawai‘i County may use VINT1 on high power with a wideband emission and other CTCSS tones at their licensed fixed repeater/mobile relay sites.

Mobile and Portable Configuration						
Label	**Direct Label**	**Receive (Rx)**	**Trans (Tx)**	**Station Class[15]**	**CTCSS RX/TX**	**Usage**
						(Less than 15 Watts ERP)
	VINT3D	151.325	151.325	FBT / MO	156.7	
VINT4		151.355	159.2175	FB2T/MO/FX1	156.7	Tactical-Low Level Repeat only (Less than 15 Watts ERP)
	VINT4D	151.355	151.355	FBT / MO	156.7	
	VFIRED	154.3025	154.3025	FBT/MO	CSQ/ 156.7	Tactical (direct) FIRE/EMS (Less than 15 Watts ERP)
	VMEDD	155.3400	155.3400	FBT/MO	CSQ/ 156.7	Tactical (direct) FIRE/EMS (Also for ground to air use) (Less than 15 Watts ERP)
	VLAWD	155.4750	155.4750	FBT/MO	CSQ/ 156.7	Tactical (direct) Law Enforcement (Less than 15 Watts ERP)
VCOML		154.34	159.315	FB2T/MO/FX1	COML Assigned	Communications Leader (COML) use on Hawai‘i County incident only
	VCOMLD	154.34	154.34	FBT/MO	COML Assigned	Communications Leader (COML) use on Hawai‘i County incident only
VHF COM		154.28 wideband	153.77 wideband	FB2T/MO/FX1	CSQ/ D364	O‘ahu only. Contact O‘ahu RPZ for details on proper use. Aka VR6

VHF Channel Name Cross Reference

This channel plan establishes specific labels for VHF channels to assure consistent use throughout the state. These labels are listed below and all participating agencies should use them if possible. Alphanumeric radio displays should be consistent with the examples listed below depending on each radio's capability. Any reference to previous identifiers (for example "VHF mutual aid") should be removed from the radio display. The NPSTC Labels may be added to radios as an extra channel group for VCALL and VTAC frequencies, but they may not be used in place of the standard Hawai‘i labels. The Transportable Repeater for Interoperable Communications (TRIC) channel labels only apply to the Hawai‘i Strategic Reserve temporary repeaters/mobile relays. As with any repeater/mobile relay, users should take care to note that the Tx and Rx frequencies are an inverse[17] of the Tx and Rx frequencies listed in the channel figures for mobile and portable configurations.

[17] The mobile Tx frequency is the repeater Rx frequency and the mobile Rx frequency is the repeater Tx frequency.

VHF Channel Name Cross Reference			
Channel Name / Label	**NPSTC Recommended Name / Label**	**Recommended 3-Digit Name / Label**	**TRIC Channel Label**
VCALL	VCALL10	10	
VTAC1	VTAC11	11	
VTAC2	VTAC12	12	
VTAC3	VTAC13	13	
VTAC4	VTAC14	14	
VR5		VR5	
VR5D		V5D	
VR6		VR6	
VR6D		V6D	
VR7		VR7	
VR7D		V7D	
VR8		VR8	
VR8D		V8D	
VR9		VR9	
VR9D		V9D	
VINT1		21	A - Red
VINT1D		21D	
VINT2		22	B - Red
VINT2D		22D	
VINT3		23	C - Red
VINT3D		23D	
VINT4		24	
VINT4D		24D	
VFIRED	VFIRE26	26D	
VMEDD	VMED28	28D	
VLAWD	VLAW31	31D	
VCOML		39	
VCOMLD		39D	

Specific Guidelines – UHF 450 MHz Narrowband Channels

Note: This plan does not recognize or identify VHF or UHF wideband (above 12.5 kHz bandwidth) channels.

For UHF interoperability, the four national channels described in Figure 2 (UCALL through UTAC3) will be used. In addition there are four Region 11 (Hawai‘i) repeater channels, two low-level tactical repeater channels and three direct tactical channels that are described in Figure 2. Note that wherever channels are assigned as a pair, the portable/mobile transmit frequency is exactly 5 MHz higher than the receive frequency.

All UHF radio using public safety agencies and users of the frequencies associated with this plan "Must-Carry" the channels listed in Figure 2 (exceptions for ULOW4D and ULOW5D are noted in the figure) in their UHF subscriber radios.[18]

Note the following:

- The FCC has identified UHF interoperability channels that can be used throughout the United States (UCALL & UTAC1 – UTAC3). Region 11 has identified URs (Regional Tactical Interoperability Channels) and ULOWs (Low Level Tactical Interoperability Channels) for use within Hawai‘i. Some of these interoperable channels may already be licensed by multiple agencies for interoperability use throughout the state.
- The national channel UCALL is designated as a multi-discipline, multi-agency public safety interoperability calling channel for all public safety agencies and other users of the frequencies associated with this channel plan. This channel is designated for interoperable UHF communications between mobile/portable radios and base stations, temporary base stations and an on-incident incident commander.
- The national tactical interoperability channels UTAC1, UTAC2 and UTAC3 may be operated as repeated channels, or as direct (simplex) channels UTAC1D, UTAC2D and UTAC3D. They should be assigned on incident by the incident commander (Note that the D is appended when using in direct or talk around mode).
- The three Low Level Tactical Interoperability Channels ULOW53D, ULOW54D and ULOW55D will never be repeated and are to be used in direct (simplex) mode only. ULOW54D is only for Fire/EMS use, and ULOW55D is only for Law Enforcement use.
- Gateways, patching or cross-band repeating of the UHF calling channel is only allowed to calling channels in other bands. Gateways, patching or cross-band repeating of UCALL to any channels other than ICALL, VCALL, 7CALL50 or 7CALL70 is not permitted.
- Patching to/between interoperability tactical channels is permitted during emergency situations if so directed by the incident commander.

[18] Some systems may be limited in channel capacity. In this case the entity will not be required to program all the Must-Carry channels in every radio.

- There is a 15 Watt maximum ERP limit on all five ULOW channels. This limit is for any transmission including portables, mobiles, base stations, portable repeaters/mobile relays or fixed repeaters/mobile relays.
- High Site, High Power Installation of UTAC1, UTAC2 or UTAC3 is prohibited in the State of Hawai‘i. Instead, these assets are designated for use within more limited regional footprints to enable on-site interoperable communications between multiple agencies for incident support.
- The URs may be installed at fixed, high Site, high power repeaters/mobile relays as follows: UR5 & 7 may be installed at repeaters/mobile relays in Kaua‘i & Maui RPZs; UR6 & 8 may be installed at repeaters/mobile relays in Honolulu and Hawai‘i RPZs. Any fixed repeaters/mobile relays will require separate licenses acquired by their operators.
- Note that the use of P25 compliant radios may become mandatory for public safety users in Region 11 at some point in the future. Until that point all radios will use the CTCSS codes designated in figure 1.
- The channels described in Figure 2 are to be used in accordance with this plan as narrowband channels only. However, users should recognize that in-coming resources from out-of-region might not be equipped with all of these channels, or may have some of them installed in wideband radios.
- Mobile Command Posts should be equipped with temporary transmitters as follows:
    - UCALL Base, dedicated to monitoring at all times (station class FBT)
    - Interoperability direct channel base stations (station class FBT)
    - Interoperability repeater/mobile relay control stations (station class FX1)
    - Temporary repeater/mobile relay stations (Station Class FB2T) may also be deployed

Figure 2 - UHF 450 MHz Narrowband Interoperability Channels

Emission Designator: 11K0F3E

Mobile and Portable Configuration						
Label	**Direct Label**	**Receive (Rx)**	**Trans (Tx)**	**Station Class[19]**	**CTCSS RX/TX**	**Usage**
UCALL		453.2125	458.2125	FB2T/MO/ FX1	CSQ /156.7	Calling Channel (Repeater)
	UCALLD	453.2125	453.2125	FBT / MO	CSQ /156.7	Calling Channel (direct)
UTAC1		453.4625	458.4625	FB2T/MO/ FX1	CSQ /156.7	Tactical (Repeater) (high site/power prohibited)
	UTAC1D	453.4625	453.4625	FBT / MO	CSQ /156.7	Tactical (direct)
UTAC2		453.7125	458.7125	FB2T/MO/ FX1	CSQ /156.7	Tactical (Repeater) (high site/power prohibited)
	UTAC2D	453.7125	453.7125	FBT / MO	CSQ /156.7	Tactical (direct)
UTAC3		453.8625	458.8625	FB2T/MO/ FX1	CSQ /156.7	Tactical (Repeater) (high site/power prohibited)
	UTAC3D	453.8625	453.8625	FBT / MO	CSQ /156.7	Tactical (direct)
UR5		453.275	458.275	FB2T/MO/ FX1	156.7	Tactical – High site/power Repeat only in Kauaʻi & Maui . May experience interference near downtown Honolulu.[20]
	UR5D	453.275	453.275	FBT / MO	156.7	
UR6		453.125	458.125	FB2T/MO/ FX1	156.7	Tactical – High site/power Repeat only in Oʻahu and Hawaiʻi
	UR6D	453.125	453.125	FBT / MO	156.7	
UR7		453.775	458.775	FB2T/MO/ FX1	156.7	Tactical – High site/power Repeat only in Kauaʻi and Maui
	UR7D	453.775	453.775	FBT / MO	156.7	
UR8		460.425	465.425	FB2T/MO/ FX1	156.7	Tactical – High site/power Repeat only in Oʻahu and Hawaiʻi[21]
	UR8D	460.425	460.425	FBT / MO	156.7	
ULOW51		460.200	465.200	FB2T/MO/ FX1	156.7	Tactical-Low Level Repeat only (Less than 15 Watts ERP)
	ULOW51D	460.200	460.200	FBT / MO	156.7	

[19] FB2T (temporary repeater/mobile relay) is only licensed for the Receive (Rx) and FX1 (Control) is only licensed for the Transmit (Tx) frequency. MO (mobile or portable) is licensed for both.

[20] Frequency is also licensed by the State on a repeater at Kuhio Park Terrace

[21] Also licensed by the Honolulu Police Department

Mobile and Portable Configuration						
Label	**Direct Label**	**Receive (Rx)**	**Trans (Tx)**	**Station Class[19]**	**CTCSS RX/TX**	**Usage**
ULOW52		460.625	465.625	FB2T/MO/ FX1	156.7	Tactical-Low Level Repeat only (Less than 15 Watts ERP)
	ULOW52D	460.625	460.625	FBT / MO	156.7	
	ULOW53D	453.3125	453.3125	FBT/MO	156.7	Tactical (direct) - Anyone (Less than 15 Watts ERP)
	ULOW54D	453.8125	453.8125	FBT/MO	156.7	Tactical (direct) - FIRE/EMS (Less than 15 Watts ERP)
	ULOW55D	460.2375	460.2375	FBT/MO	156.7	Tactical (direct) - Law Enforcement (Less than 15 Watts ERP)

UHF Channel Name Cross Reference

This channel plan establishes specific labels for UHF channels to assure consistent use throughout the state. These labels are listed below and all participating agencies should use them if possible. Alphanumeric radio displays should be consistent with the examples listed below depending on each radio's capability. Any reference to previous identifiers (for example "UHF common") should be removed from the radio display. The NPSTC Labels may be added to radios as an extra channel group for UCALL and UTAC frequencies, but they may not be used in place of the standard Hawai'i labels. The TRIC channel labels only apply to the Hawai'i Strategic Reserve temporary repeaters/mobile relays. As with any repeater/mobile relay, users should take care to note that the Tx and Rx frequencies are an inverse[22] of the Tx and Rx frequencies listed in the channel figures for mobile and portable configurations.

[22] The mobile Tx frequency is the repeater Rx frequency and the mobile Rx frequency is the repeater Tx frequency.

UHF Channel Name Cross Reference			
Channel Name / Label	**NPSTC Recommended Name / Label**	**Recommended 3-Digit Name / Label**	**TRIC Channel Label**
UCALL	UCALL40	40	
UCALLD	UCALL40D	40D	
UTAC1	UTAC41	41	A - White
UTAC1D	UTAC41D	41D	
UTAC2	UTAC42	42	B - White
UTAC2D	UTAC42D	42D	
UTAC3	UTAC43	43	C - White
UTAC3D	UTAC43D	43D	
UR5		UR5	
UR5D		U5D	
UR6		UR6	
UR6D		U6D	
UR7		UR7	
UR7D		U7D	
UR8		UR8	
UR8D		U8D	
ULOW51		51	
ULOW51D		51D	
ULOW52		52	
ULOW52D		52D	
ULOW53D		53D	
ULOW54D		54D	
ULOW55D		55D	

Specific Guidelines – Optional 700 MHz Channels

For 700 MHz interoperability, the national channels described in Figure 3 below may be used.

Any 700 MHz radio using public safety agencies and other users of the frequencies associated with this plan may carry the channels listed in Figure 3 in their 700 MHz subscriber radios. Unlike the VHF, UHF and 800 MHz interoperability channels, the use of these channels is not mandatory, and therefore these are NOT "Must-Carry" channels. Every radio that has 700 MHz capability will also have 800 MHz capability (as of the issue date of this document). The channels are listed in this section to increase the total number of available interoperability channels in the 700/800 MHz bands for those that wish to implement them.

Note the following:

- The FCC has identified many 700 MHz interoperability channels that can be used throughout the United States. Region 11 has emphasized the channels in Figure 3 for use within Hawai'i. Some of these interoperable channels may already be licensed by multiple agencies for interoperability use throughout the state.
- The national channel 7CALL50 and 7CALL70 are designated as a multi-discipline, multi-agency public safety interoperability calling channels for all public safety agencies and other users of the frequencies associated with this channel plan. These channels are designated for interoperable 700 MHz communications between mobile/portable radios and base stations, temporary base stations and an on-incident incident commander.
- The tactical repeater/mobile relay channels 7TAC55, 7TAC56, 7TAC71, 7TAC72, 7TAC73, 7TAC74, 7TAC75, and 7TAC76 should be assigned on incident by the incident commander (Note that the D is appended when using in direct or talk around mode).
- Gateways, patching or cross-band repeating of the 700 calling channels are only allowed to each other and to calling channels in other bands. Gateways, patching or cross-band repeating of the 700 calling channels to any channels other than VCALL, UCALL, ICALL, 7CALL50 or 7CALL70 is not permitted.
- Patching to/between interoperability tactical channels is permitted during emergency situations if so directed by the incident commander.
- High Site, High Power Installation of 7TAC55, 7TAC56, 7TAC71, 7TAC72, 7TAC73, 7TAC74, 7TAC75, or 7TAC76 is prohibited in the State of Hawai'i.
- Communications on 700 MHz interoperability channels must always use P25 Phase 1 CAI digital modulation with an NAC of $293.
- The 700 MHz channels described in Figure 3 may be used in accordance with this plan. However, users should recognize that in-coming resources from out-of-region might not yet be equipped with any of these channels.

- Mobile Command Posts should be equipped with temporary transmitters as follows:
    - 7CALL50 Base, dedicated to monitoring at all times (station class FBT)
    - 7CALL70 Base, dedicated to monitoring at all times (station class FBT)
    - Interoperability direct channel base stations (station class FBT)
    - Interoperability repeater/mobile relay control stations (station class FX1)
    - Temporary repeater/mobile relay stations (Station Class FB2T) may also be deployed

Figure 3 - 700 MHz Interoperability Channels

Emission Designator: 11K2G2E

Mobile and Portable Configuration						
Label	**Direct Label**	**Receive (Rx)**	**Trans (Tx)**	**Station Class[23]**	**P25 NAC Hex/Dec**	**Usage**
7CALL50		769.24375	799.24375	FB2T/MO/FX1	$293 / 659	Calling Channel
	7CALL50D	769.24375	769.24375	FBT / MO	$293 / 659	Calling Channel (direct)
7CALL70		773.25625	803.25625	FB2T/MO/FX1	$293 / 659	Calling Channel
	7CALL70D	773.25625	773.25625	FBT / MO	$293 / 659	Calling Channel (direct)
7TAC55		769.74375	799.74375	FB2T/MO/FX1	$293 / 659	Tactical Repeater Channel
	7TAC55D	769.74375	769.74375	FBT / MO	$293 / 659	Tactical Channel (Direct)
7TAC56		770.24375	800.24375	FB2T/MO/FX1	$293 / 659	Tactical Repeater Channel
	7TAC56D	770.24375	770.24375	FBT / MO	$293 / 659	Tactical Channel (Direct)
7TAC71		773.10625	803.10625	FB2T/MO/FX1	$293 / 659	Tactical Repeater Channel
	7TAC71D	773.10625	773.10625	FBT / MO	$293 / 659	Tactical Channel (Direct)
7TAC72		773.60625	803.60625	FB2T/MO/FX1	$293 / 659	Tactical Repeater Channel
	7TAC72D	773.60625	773.60625	FBT / MO	$293 / 659	Tactical Channel (Direct)
7TAC73		774.10625	804.10625	FB2T/MO/FX1	$293 / 659	Tactical Repeater Channel
	7TAC73D	774.10625	774.10625	FBT / MO	$293 / 659	Tactical Channel (Direct)
7TAC74		774.60625	804.60625	FB2T/MO/FX1	$293 / 659	Tactical Repeater Channel
	7TAC74D	774.60625	774.60625	FBT / MO	$293 / 659	Tactical Channel (Direct)
7TAC75		773.75625	803.75625	FB2T/MO/FX1	$293 / 659	Tactical Repeater Channel
	7TAC75D	773.75625	773.75625	FBT / MO	$293 / 659	Tactical Channel

[23] FB2T (temporary repeater/mobile relay) is only used for the Receive (Rx) and FX1 (Control) is only used for the Transmit (Tx) frequency. MO (mobile or portable) is used for both.

Mobile and Portable Configuration						
Label	**Direct Label**	**Receive (Rx)**	**Trans (Tx)**	**Station Class[23]**	**P25 NAC Hex/Dec**	**Usage**
						(Direct)
7TAC76		774.25625	804.25625	FB2T/MO/FX1	$293 / 659	Tactical Repeater Channel
	7TAC76D	774.25625	774.25625	FBT / MO	$293 / 659	Tactical Channel (Direct)
7LAW61		770.39375	800.39375	FB2T/MO/FX1	$293 / 659	Tactical Repeat – Law Enforcement Only
	7LAW61D	770.39375	770.39375	FBT / MO	$293 / 659	Tactical Repeat (Direct) – Law Enforcement Only
7FIRE63		769.89375	799.89375	FB2T/MO/FX1	$293 / 659	Tactical Repeat – Fire/EMS Only
	7FIRE63D	769.89375	769.89375	FBT / MO	$293 / 659	Tactical Repeat (Direct) – Fire/EMS Only
7MED65		769.39375	799.39375	FB2T/MO/FX1	$293 / 659	Tactical Repeat – Fire/EMS Only
	7MED65D	769.39375	769.39375	FBT / MO	$293 / 659	Tactical Repeat (Direct) – Fire/EMS Only
7MOB79		774.50625	804.50625	MO3/MO/FX1	$293 / 659	Mobile Repeater Use (MO3) Only
	7MOB79D	774.50625	774.50625	FBT / MO	$293 / 659	Mobile Repeat Channel (Direct)

700 MHz Channel Name Cross Reference

Hawai‘i uses the NPSTC Recommended Naming Convention for 700 MHz interoperability channels. There are no 700 MHz channels programmed into the TRICs.

Specific Guidelines – 800 MHz Channels

For 800 MHz interoperability, the five national channels (with direct) described in Figure 4 will be used. In addition, there are five Region 11 (Hawai‘i) channels, four low-level tactical channels, and three direct tactical channels. Note that in the 800 MHz band, all channels are assigned as a pair of frequencies with the mobile/portable transmit frequency 45 MHz lower than the receive frequency.

All 800 MHz radio using public safety agencies and other users of the frequencies associated with this plan "Must-Carry" the channels listed in Figure 4 (exceptions for TAC86D, TAC87D, COML and COMLD are noted in the figure) in their 800 MHz subscriber radios.

Note the following:

- The FCC has identified national 800 MHz interoperability channels that can be used throughout the United States (ICALL & ITACs 1 through 4). The Region 11 RPC (Regional Planning Committee) has also identified RTAC (Regional Tactical Interoperability Channels) and TAC (Low Level Tactical Interoperability Channels) for use within Hawai‘i.
- The national channel ICALL is designated as a multi-discipline, multi-agency public safety interoperability calling channel for all public safety agencies and other users of the frequencies associated with this channel plan. This channel is designated for interoperable 800 MHz communications between mobile/portable radios and base stations, temporary base stations and an on-incident incident commander.
- The Low Level Tactical Interoperability Channels TAC81, TAC82, TAC83, TAC84 may be operated as repeated channels, or as direct (simplex) channels (TAC81D, TAC82D, TAC83D and TAC84D), and should be assigned on incident by the incident commander (Note that the D is appended when using in direct/simplex or talk around mode).
- The three Low Level Tactical Interoperability Channels TAC85D, TAC86D and TAC87D will never be repeated and are to be used in direct mode only. TAC 86D is only for Fire/EMS use and TAC87D is only for Law Enforcement use.
- Gateways, patching or cross-band repeating of the 800 calling channel is only allowed to calling channels in other bands. Gateways, patching or cross-band repeating of the 800 channel to any channels other than VCALL, UCALL, 7CALL50 or 7CALL70 is not permitted.
- Patching to/between interoperability tactical channels is permitted during emergency situations if so directed by the incident commander.
- There is a 15 Watt maximum ERP limit on all TAC8x (81-87) channels in repeat or direct mode. This limit is for any transmission including portables, mobiles, base stations, portable repeaters/mobile relays, or fixed repeaters/mobile relays.

- High Site, High Power Installation of ITAC1, ITAC2, ITAC3, and ITAC4 in base, repeat or remote base mode is prohibited in the State of Hawai‘i. Instead, these assets are designated for use within more limited regional footprints to enable on-site interoperable communications between multiple agencies for incident support.
- The RTACs may be installed at fixed, high site, high power repeaters/mobile relays as follows: RTAC 5 & 7 may be installed at repeaters/mobile relays in Kaua‘i & Maui counties; RTAC 6 & 8 may be installed at repeaters/mobile relays in Honolulu and Hawai‘i counties. Any fixed repeaters/mobile relays will require separate licenses acquired by their operators.
- RTAC9 is a special channel designated for cross-band repeat, primarily on deployable repeaters/mobile relays.
- Note that the use of P25 compliant radios may become mandatory for public safety users in Region 11 at some point in the future. Until that point all radios will use the CTCSS codes designated in Figure 4.
- The channels described in Figure 4 are to be used in accordance with this plan. However, users should recognize that in-coming resources from out-of-region might not be equipped with all of these channels, or may have some of them installed with different names.
- Mobile Command Posts should be equipped with temporary transmitters as follows:
    - ICALL Base, dedicated to monitoring at all times (station class FBT)
    - Interoperability direct channel base stations (station class FBT)
    - Interoperability repeater/mobile relay control stations (station class FX1)
    - Temporary repeater/mobile relay stations (Station Class FB2T) may also be deployed
- The COML channel may only be used by a certified Communications Unit Leader (COML) in support of incident operations or exercises. The COML may only program this channel into temporary bases, temporary repeaters/mobile relays, mobiles and control stations that are under the direct control of members of the Communications Unit. Emission and power limits must adhere to the license (WQMM833). The COML will assign the CTCSS tones for use on an incident/exercise. In the absence of a tone assignment all radios will use carrier squelch only (CSQ) for transmit and receive.

Figure 4 - 800 MHz Interoperability Channels

Emission Designators: 14K0F3E[24], 20K0F3E[25]

Mobile and Portable Configuration						
Label	**Direct Label**	**Receive (Rx)**	**Trans (Tx)**	**Station Class[26]**	**CTCSS RX/TX**	**Usage**
ICALL		851.0125	806.0125	FB2T/MO/FX1	CSQ/156.7	Calling Channel (repeater)
	ICALLD	851.0125	851.0125	FBT / MO	CSQ/156.7	Calling Channel (direct)
ITAC1		851.5125	806.5125	FB2T/MO/FX1	CSQ/156.7	Tactical (repeater) High site/power prohibited
	ITAC1D	851.5125	851.5125	FBT / MO	CSQ/156.7	Tactical (direct)
ITAC2		852.0125	807.0125	FB2T/MO/FX1	CSQ/156.7	Tactical (repeater) High site/power prohibited
	ITAC2D	852.0125	852.0125	FBT / MO	CSQ/156.7	Tactical (direct)
ITAC3		852.5125	807.5125	FB2T/MO/FX1	CSQ/156.7	Tactical (repeater) High site/power prohibited
	ITAC3D	852.5125	852.5125	FBT / MO	CSQ/156.7	Tactical (direct)
ITAC4		853.0125	808.0125	FB2T/MO/FX1	CSQ/156.7	Tactical (repeater) High site/power prohibited
	ITAC4D	853.0125	853.0125	FBT / MO	CSQ/156.7	Tactical (direct)
RTAC5		851.9875	806.9875	FB2T/MO/FX1	146.2	Tactical – High site/power repeat only in Kauaʻi and Maui RPZ
	RTAC5D	851.9875	851.9875	FBT / MO	146.2	
RTAC6		851.4875	806.4875	FB2T/MO/FX1	146.2	Tactical – High site/power repeat only in Oʻahu and Hawaiʻi RPZ
	RTAC6D	851.4875	851.4875	FBT / MO	146.2	
RTAC7		852.9875	807.9875	FB2T/MO/FX1	146.2	Tactical – High site/power repeat only in Kauaʻi and Maui RPZ
	RTAC7D	852.9875	852.9875	FBT / MO	146.2	
RTAC8		852.4875	807.4875	FB2T/MO/FX1	146.2	Tactical – High site/power repeat only in Oʻahu and Hawaiʻi RPZ
	RTAC8D	852.4875	852.4875	FBT / MO	146.2	
RTAC9		853.4875	808.4875	FB2T/MO/FX1	146.2	Special – Default use is for cross-banding repeat in any RPZ
	RTAC9D	853.4875	853.4875	FBT / MO	146.2	Tactical (direct)
TAC81		851.2750	806.2750	FB2T/MO/FX1	136.5	Tactical-Low Level Repeater only (less than 15 Watts ERP)
	TAC81D	851.2750	851.2750	FBT / MO	136.5	

[24] 14K0F3E (14 kHz bandwidth) is to be used for all except the national channels of ICALL, ITAC1, ITAC2, ITAC3, ITAC4 and their corresponding Direct or "D" Channels.

[25] 20K0F3E (20 kHz bandwidth) is to be used for the national channels of ICALL, ITAC1, ITAC2, ITAC3, ITAC4 and their corresponding Direct or "D" Channels.

[26] FB2T (temporary repeater/mobile relay) is only licensed for the Receive (Rx) and FX1 (Control) is only licensed for the Transmit (Tx) frequency. MO (mobile or portable) is licensed for both.

Mobile and Portable Configuration						
Label	**Direct Label**	**Receive (Rx)**	**Trans (Tx)**	**Station Class[26]**	**CTCSS RX/TX**	**Usage**
TAC82		851.7750	806.7750	FB2T/MO/FX1	136.5	Tactical-Low Level Repeater only (less than 15 Watts ERP)
	TAC82D	851.7750	851.7750	FBT/MO	136.5	
TAC83		852.2750	807.2750	FB2T/MO/FX1	136.5	Tactical-Low Level Repeater only (less than 15 Watts ERP)
	TAC83D	852.2750	852.2750	FBT/MO	136.5	
TAC84		852.7750	807.7750	FB2T/MO/FX1	136.5	Tactical-Low Level Repeater only (less than 15 Watts ERP)
	TAC84D	852.7750	852.7750	FBT / MO	136.5	
	TAC85D	853.2750	853.2750	FBT / MO	136.5	Tactical (direct) – Anyone may use (less than 15 Watts ERP)
	TAC86D	853.5250	853.5250	FBT / MO	136.5	Tactical (direct) – Fire/EMS (less than 15 Watts ERP)
	TAC87D	853.7750	853.7750	FBT / MO	136.5	Tactical (direct) – Law Enforcement (less than 15 Watts ERP)
COML		858.2625	813.2625	FB2T/MO/FX1	COML Assigned	Communications Leader (COML) use only
	COMLD	858.2625	858.2625	FBT/MO	COML Assigned	Communications Leader (COML) use only

800 MHz Channel Name Cross Reference

This channel plan establishes specific labels for 800 MHz channels to assure consistent use throughout the state. These labels are listed below and all participating agencies should use them if possible. Alphanumeric radio displays should be consistent with the examples listed below depending on each radio's capability. Any reference to previous identifiers (for example "800 common") should be removed from the radio display. The NPSTC Labels may be added to radios as an extra channel group for ICALL and ITAC frequencies, but they may not be used in place of the standard Region 11 labels. The TRIC channel labels only apply to the Hawai'i Strategic Reserve temporary repeaters/mobile relays. As with any repeater/mobile relay, users should take care to note that the Tx and Rx frequencies are an inverse[27] of the Tx and Rx frequencies listed in the channel figures for mobile and portable configurations.

[27] The mobile Tx frequency is the repeater Rx frequency and the mobile Rx frequency is the repeater Tx frequency.

800 MHz Channel Name Cross Reference			
Channel Name / Label	**NPSTC Recommended Name / Label**	**Recommended 3-Digit Name / Label**	**TRIC Channel Label**
ICALL	8CALL90	90	
ICALLD	8CALL90D	90D	
ITAC1	8TAC91	91	A - Yellow
ITAC1D	8TAC91D	91D	
ITAC2	8TAC92	92	B - Yellow
ITAC2D	8TAC92D	92D	
ITAC3	8TAC93	93	C - Yellow
ITAC3D	8TAC93D	93D	
ITAC4	8TAC94	94	
ITAC4D	8TAC94D	94D	
RTAC5		R5	
RTAC5D		R5D	
RTAC6		R6	
RTAC6D		R6D	
RTAC7		R7	
RTAC7D		R7D	
RTAC8		R8	
RTAC8D		R8D	
RTAC9		R9	
RTAC9D		R9D	
TAC81		81	A - Blue
TAC81D		81D	
TAC82		82	B - Blue
TAC82D		82D	
TAC83		83	C - Blue
TAC83D		83D	
TAC84		84	
TAC84D		84D	
TAC85D		85D	
TAC86D		86D	
TAC87D		87D	
COML		99	
COMLD		99D	

P25/Project 25 Standard ID Allocations

Many organizations within the State of Hawai‘i are contemplating the use of P25 systems or radios. In order to effectively use P25 across jurisdictions certain standards for selection of identification codes have been implemented for P25 systems, especially P25 trunked systems. The statewide interoperability coordinator, which in Hawai‘i is presently the SCIP (Statewide Communications Interoperability Plan) committee, will work with each organization to ensure that the IDs are properly implemented and recorded. Any public safety organization contemplating the acquisition of a P25 system must contact the SCIP for guidance and ID assignments.

The following identification codes (IDs) will be used when placing P25 systems or radios into operation within the State of Hawai‘i:

Talk Group IDs

Five Digits: 00000 to 65,535[28]

00000 = reserved by system; 00001 = default value, 65,535 = all call; 10,000 to 65,534 are not to be used

Format: 0JDxx -- Leading zero; J = Jurisdiction; D = Discipline; xx = agency assigned, 00 to 99

0	J – Jurisdictions		D – Disciplines		00 - 99
0	0	SCIP Assigned	1	Law Enforcement	xx
0	1	County of Kaua‘i	2	Law Enforcement	xx
0	2	City and County of Honolulu	3	Law Enforcement	xx
0	3	City and County of Honolulu	4	EMS	xx
0	4	Reserved	5	Fire/LNR/Ocean	xx
0	5	County of Maui	6	Fire	xx
0	6	County of Hawai‘i	7	Civil Defense/Critical Infrastructure	xx
0	7	State of Hawai‘i	8	Transportation	xx
0	8	Other	9	Other/Cross Discipline (System Common)	xx
0	9	Reserved	0	Reserved	xx

Example: The Talk Group ID - 07582 represents a talk group controlled by the State of Hawai‘i, used in the Fire/Land and Natural Resources/Ocean Safety discipline, with a locally assigned ID of 82.

[28] All IDs listed here are in decimal format although in other documents they may also appear in hexadecimal format. A hexadecimal number is usually preceded by a $ sign, as in the NAC code of $293.

Unit IDs

Eight decimal digits: 00000000 to 16,777,214

00000000 = reserved by system; 16,777,215 = reserved by system - used when implementing a group call with a talk group ID; 10,000,000 to 16,777,214 are system special purpose IDs

Format: 08JJDyyy

Leading 08 throughout Hawai‘i; JJ = Jurisdiction; D = Discipline; yyy = agency assigned, 000 to 999

08	JJ - Jurisdictions		D - Disciplines		000 - 999
08	00 to 09	SCIP assigned	1	Law Enforcement	yyy
08	10 to 19	County of Kaua‘i	2	Law Enforcement	yyy
08	20 to 29	City & County of Honolulu	3	Law Enforcement	yyy
08	30 to 39	City & County of Honolulu	4	Fire	yyy
08	40 to 49	Reserved	5	Fire/LNR/Ocean	yyy
08	50 to 59	County of Maui	6	EMS	yyy
08	60 to 69	County of Hawai‘i	7	Civil Defense/Critical Infrastructure	yyy
08	70 to 79	State of Hawai‘i	8	Transportation	yyy
08	80 to 89	Other	9	Other/Cross Discipline (System Common)	yyy
08	90 to 99	Reserved	0	Reserved	yyy

Example: The Unit ID - 08534555 represents a unit in Hawai‘i, controlled by the County of Maui, used in the Fire discipline, with a locally assigned ID of 555.

Site IDs

As organizations deploy P25 systems that may interconnect through interfaces or directly with other P25 systems the sites that they use throughout Hawai‘i will need unique identifiers. An organization will almost certainly have its own name or number for a site in addition to this P25 site ID. Organizations assigning a P25 site ID in Hawai‘i will assign it according to the county in which it is physically located.

Allocation by county in which the site is physically located:

Starting Site IDs	Ending Site ID	County
0	15	Unused
16	31	Kaua‘i
32	47	Honolulu
48	63	Honolulu
64	79	Honolulu
80	95	Honolulu
96	111	Honolulu
112	127	Honolulu
128	143	Maui
144	159	Maui
160	175	Maui
176	191	Maui
192	207	Hawai‘i
208	223	Hawai‘i
224	239	Hawai‘i
240	255	Spare

Example: The County of Hawai‘i has installed a P25 site at Haleakala. They may be assigned the Site ID of 190 since the site is physically within the boundaries of Maui County.

Summary

By agreeing to the conditions of this Channel Plan public safety entities throughout Hawai‘i will significantly strengthen interoperable communications amongst themselves. The plan is not meant as a stand-alone document, but instead is part of a broader suite of interoperability efforts and documents created by the state’s interoperability governance bodies.

The policies and procedures detailed in the plan touch upon all the elements of the U.S. Department of Homeland Security’s Interoperability Continuum. Integration of the Channel Plan with the Hawai‘i Statewide Communications Interoperability Plan and the TIC Plans from each of the Hawai‘i RPZs satisfies the highest level of the Governance Element. The Channel Plan itself serves as a broad Standard Operating Procedure for interoperable use of radios. The Technology element is met by the establishment of standard frequencies, CTCSS tones and frequencies on multiple radio spectrum bands. The plan further allows for and encourages daily use of the interoperability channels as required in the Usage element. And finally, every user of this plan must include the use of these channels in their training and exercises as is emphasized in the Continuum’s Training and Exercise element.

The Hawai‘i Statewide Interoperability Channel Plan is meant to be a relevant document for the near term and for many years in the future. Please make sure that you discover its strengths and weaknesses and help the State keep it current. The Department of Accounting and General Services is committed to updating this plan as often as is necessary to maintain its usefulness in promoting interoperable communications in Hawai‘i.

This Channel Plan is consistent with current regulatory requirements, technical standards, and grant guidelines as they are understood at the time of issue.

VI. MONITORING

Any State of Hawai‘i agency using these channels and all Responsible Organizations that have been allowed to use these channels will monitor the effectiveness of this plan. All users will observe and measure the use of the interoperability channels and recommend adjustments in assignments or procedures. Recommended changes may be submitted directly to ICSD (contact information is contained in Section IX), or may address them to the HWIN or SCIP committee.

VII. ENFORCEMENT

Every user of this channel plan and its assigned channels is responsible for enforcement of the provisions of the plan. If any abuse, misuse or alteration to these operating procedures is observed, action must be taken. Users that observe the problem should immediately try to correct it. If that is not possible, a report should be made to HWIN, the SCIP committee, ICSD, State Civil Defense, or directly to the FCC.

VIII. REFERENCES AND ATTACHMENTS

Statewide Communications Interoperability Plan; State of Hawai‘i

Part 90 of the Rules of the FCC (Part 90 of Title 47 of the Code of Federal Regulations)

47 CFR Part 2 (Part 2 of Title 47 of the Code of Federal Regulations)

The NTIA Manual (Manual of Regulations and Procedures for Federal Radio Frequency Management)

NPSTC Standard Channel Nomenclature for the Public Safety Interoperability Channels

Maui RPZ TIC Plan

Kaua‘i RPZ TIC Plan

O‘ahu RPZ TIC Plan

Hawai‘i RPZ TIC Plan

No Attachments

IX. COMMENTS AND SUGGESTIONS

Comments, recommendations, proposals, or suggestions regarding the contents of this document may be sent either via email to icsd.admin.ppmo@hawaii.gov or in writing to:

Information and Communication Services Division
Telecommunications Services Branch
1151 Punchbowl Street, Room B10
Honolulu, HI 96813

X. REVISION HISTORY

Creation Date:	Date Last Updated	Date last reviewed
March 1, 2011	March 1, 2011	March 1, 2011

Revision History		
Revision date	Revision	Author
March 1, 2011	Initial Release	ICSD / SCIP